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PART II

ENVIRONMENTAL PROTECTION AGENCY

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SOLID WASTE DISPOSAL FACILITIES

Proposed Classification Criteria

[6560-01]

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 257]

[Docket No. 4004; FRL 830-4]

SOLID WASTE DISPOSAL FACILITIES

Proposed Criteria for Classification

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: The proposed regulations contain minimum criteria for determing which solid waste land disposal facilities shall be classified as posing no reasonable probability of adverse effects on health or the environment. The regulations are required by the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976. Under the 1976 Act, all facilities which do not meet these criteria are prohibited. Any existing facility not meeting these criteria must be closed or upgraded according to a State-established compliance schedule containing an enforceable sequence of actions leading to compliance. The regulations are also proposed under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, providing guidelines for the disposal and utilization of sludge. Under the 1977 Act, the owner or operator of any publicly owned treatment works must use or dispose of sludge in accordance with these criteria, if the owner or operator chooses to use or dispose of the sludge on land. Implementation of these criteria is expected to encourage the recovery and utilization of solid waste by eliminating environmentally unacceptable disposal practices.

EPA desires comments from the general public on these proposed criteria. EPA is particularly interested in comments on: (1) Adequacy of the criteria in providing for the protection of public health and the environment: (2) practicality of implementation of the criteria (including availability of technologies and methods to comply with the criteria and to determine compliance; and the feasibility of monitoring, administrative, and enforcement programs); (3) potential impacts on segments of our society and economy: and (4) any recommended alternatives.

DATE: The public comment period on the proposed criteria will extend at least to, May 8, 1978.

PUBLIC HEARING: MARCH 1, 1978, SAN DIEGO, CALIF.

For additional information relating to public hearings see "public participation" section under supplementary information.

A draft environmental impact statement/economic impact analysis (EIS/EIA) on the criteria should be available for public review in the near future. The public comment period on the EIS/EIA will extend for 45 days from the date of publication in the FEDERAL REGISTER of the notice of its availability. The comment period on the criteria will be extended, if necessary, so that the two comment periods are concurrent and end on the same date. All written comments postmarked on or before the end of the public comment period will be considered. See "public participation" section.

ADDRESSES: The mailing address for all comments is Office of Solid Waste (WH-564), Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460; Attention: Mr. Shuster, Docket 4004. The official record of rulemaking (Docket No. 4004) is located in Room 2107, EPA, 401 M Street SW., Washington, D.C. 20460, and is available for viewing from 9 a.m. to 4 p.m., Monday through Friday, excluding holidays. All written comments received to date and all comments on the proposed criteria are filed in this docket.

PUBLIC HEARING LOCATION

The Executive Hotel (Terrace Room), 1055 First Avenue, San Diego, Calif. Registration: 7 to 7:30 p.m.

FOR FURTHER INFORMATION CONTACT:

Mr. Kenneth A. Shuster, Office of Solid Waste (WH-564), Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460; telephone 202-755-9116.

SUPPLEMENTARY INFORMATION:

Authority. These regulations (hereinafter referred to as the criteria) are being proposed pursuant to the authority of sections 1008(a)(3) and 404(a) of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (Pub. L. 94-580, 90 Stat. 2803 and 2815, 42 U.S.C. 6907(a)(3) and 6944(a)), hereinafter referred to as the Act, and pursuant to the authority of section 405(d) of the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (Pub. L. 95-217).

Section 1008(a)(3) of Pub. L. 94-580 requires EPA to "provide minimum criteria to be used by the States to define those solid waste management practices which constitute the open dumping of solid wastes." Section 4004(a) of the Pub. L. 94-580 requires EPA to promulgate regulations containing minimum criteria for determining which solid waste disposal facilities pose "no reasonable probability of adverse effects on health or the environment from disposal of solid waste at such facility," and which facilities do not. Section 405(d) of Pub. L. 95-217 requires EPA to promulgate regulations for the disposal of sludge and the utilization of sludge for various purposes.

Implementation of these criteria are expected to encourage the recovery and utilization of solid waste by eliminating environmentally unacceptable disposal practices. This is in keeping with the Act, which urges the conservation and recovery of material and energy resources.

APPROACH

The purpose of the criteria is to provide minimum national standards for the protection of health and the environment from solid waste disposal facilities. The criteria provide minimum standards for the classification of disposal facilities.

EPA recognizes there are many factors which must be considered in determining if there will be an adverse impact and what the magnitude of the impact will be. Many of the factors vary from site to site, including climate, hydrology, geology, the amount and type of wastes, and ground and surface water proximity and usage.

One aim in developing these criteria was to be as specific as possible to facilitate the distinction or classification of disposal facilities, without reducing the flexibility of State solid waste management and enforcement agencies to take into account the site-by-site variations and make assessments based on local conditions. These criteria are not intended to prevent or restrict the authority or discretion of States to develop or utilize more stringent State or site-specific (situational) standards or criteria. States may choose to require more stringent location, design, construction, operation, maintenance, and performance standards where local conditions indicate.

Whenever possible the critieria utilize existing Federal, State, and local regulations or approaches in order to avoid duplication, inconsistencies, and unnecessary new regulations. For example, the wetlands and surface water criteria utilize the NPDES permit system established for point source discharge of pollutants under section 402 of the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92-500). Also, the ground water criterion utilizes the approach of the underground injection control program proposed under the Safe Drinking Water Act (Pub. L. 93-523).

COVERAGE

These criteria for the classification of disposal facilities apply to all "solid waste" and "disposal" facilities which are defined in the Act (section 1004) as follows:

The term 'solid waste' means any garbage, refuse, sludge from a waste treatment plant,

water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permit under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

The term 'disposal' means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constitutent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

The criteria as proposed do not apply to agricultural wastes, including manures and crop residues, returned to the soil as fertilizers or soil conditioners, or to mining and milling wastes intended for return to the mine. Congressional support for this exclusion is found in the House Report on the bill:

Agricultural wastes which are returned to the soil as fertilizers or soil conditioners are not considered discarded materials (solid waste) in the sense of this legislation. Similarly, overburden resulting from mining operations and intended for return to the mine site is not considered to be discarded material within the meaning of this legislation. (H.R. Rep. No. 94-1491, 94th Cong., 2d Sess. 2 (1976)).

Based on the definition of solid waste, the land application of domestic sewage and liquid effluent from the treatment of domestic sewage are excluded. However, these criteria do apply to the land disposal of sludge resulting from the treatment of domestic sewage.

In addition, these Criteria do not apply to irrigation return flows or discharges which are point sources subject to permits under Section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

These Criteria also do not apply to the location and operation of septic tanks. However, the disposal of septic tank pumpings is subject to these Criteria.

When regulations for hazardous waste disposal facilities are promulgated under Subtitle C of the Act, facilities for the disposal of hazardous waste must comply with those regulations instead of these Criteria. Similarly, when regulations for the State Underground Injection Control Program (UICP; 40 CFR Part 146) are promulgated under authority of the Safe Drinking Water Act of 1974 (Pub. L. 93-523) they apply to underground well injection in lieu of these Criteria. However, the Criteria may be revised to incorporate sections of the UICP to reach problems in those States which do not have primary enforcement responsibility for the UICP.

The conventional use of the term "sanitary landfill" typically refers to the controlled burial of solid wastes, including municipal wastes (residential, commercial, and institutional wastes), sludges, ashes, industrial wastes, and/or construction or demolition wastes. Similarly, the term "open dump" conventionally refers to open, uncovered (often burning), and uncontrolled disposal sites for municipal and industrial wastes. These conventional definitions are more limited than intended by the definitions of the terms "sanitary landfill", "open dump", "solid waste", and "disposal" in the Act. Hence, these Criteria also apply to other types of wastes and to other solid waste management operations such as surface impoundments and waste utilization practices involving land application of solid waste as soil conditioners or fertilizers. To avoid any confusion which might otherwise result, these Criteria do not use the terms "sanitary landfill" and "open dump". The Criteria, however, provides the basis for the statutory definitions of these terms. Within the meaning of the Act, facilities which satifsy these Criteria are practices which "pose no reasonable probability of adverse effects on health or the environment" and facilities which do not satisfy these Criteria should be considered "open dumps" under those sections of the Act referring to this phrase.

Sludge Disposal and Utilization

Section 405(d) of the Federal Water Pollution Act, as amended by the Clean Water Act of 1977 (Pub. L. 95-217) requires EPA to develop regulations providing guidelines for the disposal and utilization of sludge. These Criteria are proposed to partially fulfill EPA's responsibility under Section 405(d), with respect to the land disposal and landspreading of sludge. Information on the costs of these uses of sludge is being developed and will be proposed in the future, as will guidelines on additional uses of sludge, which may include incineration, energy recovery, and give-away or sale of sludge or composted sludge. Owners and operators of publicly owned treatment works are required by Section 405(e) to use or dispose of sludge in accordance with guidelines promulgated under Section 405(d). With respect to land disposal and landspreading the owner or operator must assure compliance with these Criteria. The owner or operator must (1) analyze the sludge for cadmium and other toxic substances, (2) assure that the sludge has been appropriately stabilized, (3) determine the appropriate sludge application rates and assure that these rates are complied with, (4) determine what monitoring is required and assure that it is performed, and (5) develop any necessary contngency plans and assure they are complied with.

Adverse Effects

In establishing the need for these regulations, Congress identified a number of adverse effects on human health and safety and on the environment from improper disposal of solid wastes.

Section 1002(b) of the Act states:

"The Congress finds with respect to the environment and health, that—

"* * * (2) Disposal of solid waste and hazardous waste in or on the land without careful planning and management can present a danger to human health and the environment;

(3) As a result of the Clean Air Act, the Water Pollution Control Act, and other Federal and State laws respecting public health and the environment, greater amounts of solid waste (in the form of sludge and other pollution treatment residues) have been created. Similarly, inadequate and environmentally unsound practices for the disposal or use of solid waste have created greater amounts of air and water pollution and other problems for the environment and for health."

The House Report accompanying the Act states:

"Disposal of solid wastes, including hazardous wastes, can have adverse environmental impact in several ways. The following paragraphs discuss five different types of such impacts.

(i) Perhaps the most pernicious effect is the *contamination of ground water by leachate* from land disposal of waste * * *

(ii) Similar *pollution of surface waters* may occur * * *

(iii) Solid waste disposal can contribute to *air pollution* through open burning, incineration, evaporation, or sublimation, and wind erosion. One should add to this the problem of generation of obnoxious *odors* * * *

(iv) There have also been several cases of *acute poisoning* when hazardous materials were improperly disposed of * * *

(v) *Fires and explosions.*" (Emphasis added.) (H.R. Rep. No. 94-1491, 94th Cong., 2d Sess. 89 and 90 (1976)).

The House Report also states: "the adverse impacts * * * include fire hazards; air pollution (including reduced visibility); explosive gas migration; surface and ground water contamination; disease transfer (via vectors such as rats and flies); personal injury (to unauthorized scavangers); and, aesthetic blights" (H.R. Rep. No. 94-1491, 94th Cong., 2d Sess. 37 (1976)). A number of specific examples of each of these types of adverse effects follow this statement in the Report.

The House Report also states on page 37: "An open dump is defined as

a land disposal site where discarded materials are deposited with little or no regard for pollution or aesthetics, where the wastes are left uncovered, and where frequently the use of the site for waste disposal is neither authorized nor supervised. (Whereas), the effects on human health and the environment from real sanitary landfill should be slight."

These Criteria address these adverse effects in order to promote the proper disposal of solid waste, with no reasonable probability of adverse effects on health or the environment.

Implementation

Subtitle D of the Act specifies several actions related to these Criteria. Section 4005(b) requires EPA, within one year after promulgation of the Criteria, to publish an inventory of all facilities in the United States that do not comply with the Criteria. Thus, these Criteria will be used to determine which facilities will be included in the published inventory. Under Sections 4005(c) and 4003 of the Act, all facilities which do not meet these Criteria are prohibited. All new facilities must comply with the Criteria (Section 4003(2)). Any existing facility not in compliance must be closed or upgraded according to a State-established compliance schedule containing an enforceable sequence of actions leading to compliance within a reasonable time, not to exceed five (5) years from the date of publication of the inventory (Sections 4003(3) and 4005(c)). A facility may be placed on this State-established compliance schedule only where there is an EPA-approved State plan and where it has been demonstrated that no alternative which complies with the Criteria can be utilized. Thus, all noncomplying facilities are to be closed or upgraded as soon as practical, but in all cases within five years of publication of the inventory.

Implementation mechanisms for this prohibition include the regulatory powers established to implement the State plan (Section 4003), the citizen suit provisions of Section 7002, and the imminent hazard provisions of Section 7003. There are no statutory requirements for States to implement or enforce the open dumping prohibition, but States are not eligible for Federal financial assistance under Subtitle D of the Act if the State plan fails to provide for such implementation and enforcement. A State may, of course, adopt and implement the Criteria on its own initiative, without EPA approval of a State plan.

The inventory of open dumps is the key to implementation of the Criteria. The inventory will be conducted by evaluating solid waste disposal facilities against the Criteria and publishing a list of those facilities which do not comply with the Criteria. Since the inventory process is the precursor to State planning and enforcement action, the Agency believes that State involvement should be maximized and State priorities emphasized. Therefore, it is the Agency's intent that the inventory evaluations be conducted by the States, with funding provided by EPA.

The Agency recognizes the practical difficulties inherent in applying the Criteria to all existing and new disposal facilities. Determinations as to whether facilities pose no reasonable probability of adverse effects on health or the environment (i.e. whether facilities comply with the Criteria) will require a number of extensive technical and scientific decisions. This is especially true in determining the potential for ground-water pollution. Furthermore, since facilities found in violation of the Criteria are prohibited by Federal law, due process considerations and adequate documentation of evidence are important.

Thus, it is the Agency's intent to provide, in a logical and progressive manner, for the necessary time-phasing of the implementation of the inventory process. This will be managed through the State planning and plan implementation provisions of the Act. Specific criteria and procedures for States to use in establishing priorities for implementation of the Criteria will be provided in the Agency's Guidelines for State Plans (Section 4002). Priorities for the inventory process and enforcement of the open dumping prohibition will be established on a State-by-State basis in accordance with the procedures established in these Guidelines.

In the "Guidance for the Development of State Work Programs for FY-78 under the Resources Conservation and Recovery Act (RCRA)" sent to the States by EPA on July 29, 1977, the following inventory priorities were recommended: (1) Residential, commercial, and institutional wastes, (2) municipal wastewater treatment sludge, (3) industrial wastes and pollution control residues and sludges, (4) agricultural wastes, and (5) mining wastes.

Integration With Regulations for Hazardous Waste Disposal Facilities

Regulations for hazardous waste disposal facilities are being developed by EPA under Section 3004 of the Act. EPA feels that the environmental effects of all land disposal facilities should be equivalent. That is, equal protection of human health and the environment should be provided regardless of waste type or disposal facility type. Operational and monitoring requirements, of course, may differ depending on such factors as the potential hazard of the waste and availability and reliability of control technology.

Therefore, the development of the hazardous waste disposal regulations is being coordinated with these Criteria so that the two regulations will accomplish consistent environmental results. Operational and monitoring requirements for hazardous waste disposal facilities, however, are likely to be more stringent.

Note.—Comments are solicited: (1) on the concept of consistency of environmental effects, and (2) on whether the level of environmental protection addressed by the Criteria is adequate.

Integration With Surface Impoundment Studies Under the Safe Drinking Water Act

Section 1006(b) of the Solid Waste Disposal Act as amended requires the Administrator to integrate the provisions and enforcement of the Solid Waste Disposal Act with other Acts under the Administrator's authority, including the Safe Drinking Water Act (SDWA) (Pub. L. 93-523), to the maximum extent practicable in order to avoid needless duplication of regulations and expenditures. There is a potential overlap between the Solid Waste Disposal Act and the SDWA with regard to surface impoundments such as pits, ponds, and lagoons.

Section 1442(a)(8)(C) of the SDWA requires a study of the nature and extent of the impact on underground water of ponds, pools, lagoons, pits, or other surface disposal of contaminants in underground water recharge areas. In partial fulfillment of this requirement, EPA intends to conduct, through grants to State agencies, an assessment of surface impoundments and their effects on ground water.

The criteria proposed by this action under the Solid-Waste Disposal Act apply to all solid waste disposal facilities, including surface impoundments. Thus, the inventory of open dumps required by section 4005(b) of the Solid Waste Disposal Act would include those surface impoundments which do not comply with the criteria. EPA intends to develop the inventory through grants to State agencies.

Thus, there is the potential for confusion and duplication of effort between the studies of surface impoundments to be conducted under the SDWA and the inventory to be conducted under the Solid Waste Disposal Act. Therefore, the Agency is closely coordinating these two efforts. The State grant programs under the two Acts may be consolidated for this purpose, subject to legal and administrative constraints, but must be coordinated. To this end, the studies and assessments planned under the SDWA will be used as the basis for identifying those surface impoundments that have the greatest potential for adverse effects and thereby will help the States in developing the inventory re-

quired under the Solid Waste Disposal Act. Those impoundments which are identified as having the greatest potential for serious impact on ground water quality would be considered high priority for development of the Solid Waste Disposal Act inventory. Such impoundments which are found to violate the criteria proposed by this action would be placed on the inventory and be liable for closure or upgrading in accordance with the State planning and plan implementation provisions of the Solid Waste Disposal Act (sections 4003 and 4005) and the Federal prohibition of open dumping (section 4005).

However, the Agency has not yet determined the best regulatory approach to the control of surface impoundments. Except, of course, those surface impoundments that receive hazardous wastes are subject to the regulations for hazardous waste disposal facilities promulgated under Subtitle C of the Act. While the inventory process and Subtitle C regulations will begin to bring such facilities under State control under the Solid Waste Disposal Act, EPA will continue to explore and reevaluate its authorities under the Solid Waste Disposal Act, SDWA, the Federal Water Pollution Control Act, and the Toxic Substances Control Act of 1976 (Pub. L. 94-469, 90 Stat. 2003, 15 U.S.C. 2601) in order to determine the best regulatory approach under any or a combination of these various authorities. If these authorities are not sufficient to assure the adequate control of the disposal of wates through surface impoundments, EPA will seek additional legislative authority which will assure a solution to this serious problem. States and the general public will be allowed ample opportunity to comment on the most effective means of regulating surface impoundments such as pits, ponds, and lagoons.

Determining Compliance

Compliance with the criteria should be achieved through (1) application of the best practicable controls (technologies and practices), in conjunction with (2) environmental monitoring to determine if adverse effects do occur and if corrective action is necessary. This approach should provide for a reasonable probability of preventing adverse effects on health or the environment.

Some of the criteria establish environmental standards and others specify technologies or practices which are based on their potential for preventing adverse environmental effect. However, all the criteria specify that the facility be "so located, designed, constructed, operated, and maintained" in order to emphasize the use of best practicable controls and to allow a determination of compliance based on site-specific evaluations of these control technologies and practices. Environmental monitoring is encouraged by EPA, because it represents a direct measure of any adverse effect. However, such monitoring programs may be very expensive, in many cases may not be necessary, and may place too much reliance on corrective rather than preventive methods. Therefore, the State may determine it is not necessary to monitor if the facility is such that no adverse effect is expected because of low volume or inert or innocuous wastes, or because the control technology and practice are considered to be reasonably able to achieve the environmental standards. On the other hand, monitoring alone does not eliminate the need for application of the best practicable controls.

Discussion of Proposed Criteria

Definitions

All definitions contained in the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 apply in these Criteria. The most pertinent of these definitions are: "disposal," "sludge," "solid waste," "open dump," "sanitary landfill," and "State." The definition for "hazardous waste" given at section 1004(5) of the Act will be further defined (and revised when appropriate) under section 3001(a), and a listing of hazardous wastes will be promulgated (and revised when appropriate) under section 3001(b) of the Act.

The following definitions were taken verbatim from section 502 of the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92-500): "Contiguous zone," "navigable waters," and "point source." "Discharge of pollutants" was expanded from the definition in Pub. L. 92-500 to include nonpoint sources.

The definition of "wetlands" was taken from the Army Corps of Engineers "Permits for Discharges of Dredged or Fill Material into Waters of the United States" (33 CFR 323.2(c)). This definition is essentially the same as that contained in Executive Order 11990 (42 FR 26961, May 24, 1977), which states: "Wetlands means those areas that are inundated by surface or ground water with a frequency sufficient to support and (which) under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, wet meadows, river overflows, mud flats, and natural ponds."

The definition of "endangered" is based on the usage of this term in "Proposed Regulations, State Underground Injection Control Programs" (41 FR 36726, August 31, 1976) developed under authority of the Safe Drinking Water Act of 1974.

Environmentally Sensitive Areas

Section 257.3-1 concerns the location of disposal facilities in environmentally sensitive areas. Environmentally sensitive areas in the Criteria are wetlands, floodplains, permafrost areas, critical habitats of endangered species, and recharge zones of sole source aquifers. These areas were selected for coverage in this criterion because EPA feels these areas are natural assets (have beneficial qualities) which are not adequately protected by the other six criteria (§§ 257.3-2 through 257.3-7). Before any new site may be located or any existing disposal site may be expanded in an environmentally sensitive area, the facility must clearly meet the criteria contained in paragraphs (a) through (e) of § 257.3-1. In general, disposal sites should not be located in environmentally sensitive areas when feasible alternatives exist, unless it can be clearly demonstrated that there will be no significant adverse impact on the ecosystem or human health from the operation of the facility in such an area. In determining whether other feasible alternatives exist, the availability and practicality of alternative disposal sites (both existing and potential) should be assessed in terms of hydrogeologic, technological, environmental, economic, and other pertinent factors. In order to ensure that no significant adverse impact on the ecosystem exists, the types and extent of potential adverse impacts must be identified. The facility must be designed, constructed, operated, completed, and maintained for as long as necessary to minimize, prevent, or correct such impacts. Even if a facility by itself may have a minimal impact, consideration should be given to a general appraisal of the specific environmentally sensitive area in terms of rate of encroachment, cumulative impact, and multiplier effect of other activities.

The State agency or agencies (as designated in accordance with section 4006(b) of the Act) should review such determinations with respect to the completeness and accuracy of information, whether other alternatives exist, whether the engineering design and plans are adequate, and whether the assessment of alternatives versus potential environmental impacts provides sufficient justification for location of the facility in the environmentally sensitive area.

Wetlands. The Nation's coastal and inland wetlands are vital natural resources of great hydrological and ecological importance. Wetlands provide natural flood control, recharge of aquifers, natural purification of waters, and flow stabilization of

streams and rivers. Wetlands produce large quantities of nutrients which support complex ecosystems extending into estuaries and streams, etc., well beyond the marshes and wetland areas. Wetland habitats support fish, shellfish, mammals, waterfowl, and other wildlife fauna and flora. Wetlands are used in the production of many agricultural products and timber and for recreational and scientific pursuits.

In the past, solid waste disposal sites have frequently been located in wetland areas, generally because there has been less public resistance to locating them there, the land is cheaper, and when completed the land is ofter sold or used for a direct economic purpose. The alternation and destruction of the wetland resources through draining, dredging, landfilling and other means has had an adverse cumulative impact on wetlands and other aquatic resources. Recent estimates indicate over 40 percent of the 120 million acres of wetlands in the United States that existed 200 years ago have been irrevocably destroyed.

The intent of the § 257.3-1 (a) criterion is to prevent the destruction of wetlands. New disposal sites may not be placed in wetlands and existing operations may not be continued in wetlands unless an NPDES permit has been obtained (under section 402 of the Federal Water Pollution Control Act (FWPCA) Amendments of 1972 (Pub. L. 92-500, 86 Stat. 880, 33 U.S.C. 1342), and if a levee, dike, or other type of containment structure is to be placed in the water as part of the disposal activity, an Army Corps of Engineers permit has been obtained (under section 404 of the FWPCA) according to 33 CFR Parts 320-329. There is a strong presumption against the issuance of an NPDES permit for the discharge of solid waste into wetland areas. Only upon a showing of extraordinary circumstances—including a demonstration of alternative methods of disposal, an assessment of environmental impact for each alternative, an assessment of the technical and economic feasibility of each alternative, and a justification for the wetlands disposal alternative in view of the environmental impact and feasibility—will an NPDES application be considered and an NPDES permit issued. Any NPDES permit issued for the discharge of solid waste into wetland areas must assure that the facility utilizes appropriate technologies and/or best management practices to minimize any adverse effects.

This approach conforms with the intent of Executive Order 11990 dated May 24, 1977, concerning Protection of Wetlands.

Floodplains. Disposal of solid waste in floodplains may have several significant adverse impacts: (1) If not adequately protected from flooding, wastes in a disposal site may be inundated by water and flow from the site, affecting downstream waters; (2) since floodplains generally have direct hydraulic connection to wetlands, surface water, and ground water, location of disposal sites in floodplains may result in leachate contamination of ground water; (3) filling in the floodplain may restrict the flow of flood waters, causing greater flooding upstream; and (4) filling in the floodplain may reduce the size and effectiveness of the flood-flow retaining capacity of the floodplain which may cause a more rapid movement of flood waters downstream, resulting in higher flood levels and greater flood damages downstream.

For purposes of these Criteria the floodplain is defined by the 100-year flood level. This level is considered adequate to minimize the chances for site inundation and increased flood levels and damages. This level is considered conservative in many parts of the country because construction activities (buildings, roads, storm sewers, etc.) continue to increase runoff, thereby increasing flood levels for similar precipitation incidents. The 100-year floodplain has been mapped for many areas of the Country by the U.S. Geological Survey, Army Corps of Engineers, and Department of Housing and Urban Development. The 100-year floodplain is determined by the techniques described in "A Uniform Technique for Determining Flood Flow Frequencies," Bulletin No. 15, Water Resources Council, Hydrology Committee, December 1967. For unmapped areas, the Water Resources Council is developing procedures for determining flood levels, according to Executive Order 11988, dated May 24, 1977.

The intent of this criterion is: (1) To require an assessment of any new disposal site or expansion of any existing site in a floodplain to determine the potential impact or the disposal site on downstream and upstream waters and land, (2) to prohibit such disposal activities if the site as designed may cause increased flooding during the base flood, and (3) if the disposal site is located in a floodplain, to require the use of available technologies and methods to protect against inundation by the base flood and minimize potential for adverse effects on water quality and on the flood-flow capacity of the floodplains.

In general, it is available not to locate solid waste disposal facilities in the 100 year floodplain. Therefore, EPA encourages the search for and siting of disposal facilities out of the 100 year floodplain. However, landspreading of wastes in the floodplain as fertilizers or soil conditioners for agricultural or vegetative purposes may be beneficial and should not pose a significant adverse impact on flood levels or water quality if the other criteria are met, and, therefore, is exempt from the floodplain provision. Other disposal facilities in floodplains should be designed and operated to protect against inundation by the 100 year flood, minimize the acreage of the floodplain consumed by the site, and limit the wastes to nonhazardous, more inert types.

As with the destruction of wetlands, EPA feels that although the environmental impact of an individual site may be considered minimal, the cumulative effect of the continued encroachment on the destruction of these areas warrants a careful evaluation of total impacts of human activities and the discouragement of site location in these areas unless other suitable sites cannot be found.

This approach conforms with the intent of Executive Order 11988 dated May 24, 1977, concerning Floodplain Management. Federal Agencies are required to comply with this Executive Order and State agencies are encouraged to develop and apply similar policies and to consider the provisions of the Unified National Program for Floodplain Management of the Water Resources Council.

Permafrost areas. Permafrost is permanently frozen subsoil, occurring where the freezing depth each winter exceeds the summer thaw depth. Water in permafrost areas occurs seasonally at or near the ground surface, above the permanently frozen subsoil in the active zone. In portions of arctic Alaska the depth of thaw or active zone is less than eighteen inches.

Disposal of solid waste in permafrost areas presents three environmental problems. First, any disturbance of the delicate insulating plant and moss cover increases the depth of annual thaw. Since permafrost commonly consists of supersaturated soils and ice, an increased depth of thaw can alter the surface contour, create lakes, and cause significant erosion. Moreover, any activity to correct the erosion or to control surface and subsurface waters tends to increase the thaw and erosion problem. Second, since the active zone is commonly the only source of drinking water, solid waste disposal in the active zone may cause difficult water pollution problems. All seasonal water movement occurs in this active zone and leachate contamination is very likely. Third, waste deposited in permafrost areas is generally deposited on the surface and undergoes very little change over time so that it accumulates and remains exposed to future generations.

Current recommended practices being implemented where feasible in Alaska's arctic are as follows:

(a) Recyclable materials, such as scrap metal, batteries, tires, etc., are

salvaged and transported south for recycling or other approved uses.

(b) Combustible and putrescible wastes including sewage sludge are incinerated.

(c) Deep well injection of incinerator residue and other wastes is practiced where drilling equipment is available.

(d) Wastes are hauled to a more temperate region for environmentally sound processing and disposal.

(e) Landfilling is limited to inert incinerator residue and a few other nonrecoverable, inert items.

(f) Landfills are allowed only in selected areas where the soils are relatively dry and workable, and little or no vegetative cover exists. Only regional landfills are allowed (i.e., only the minimum number adequate to serve a region).

The assessment of alternatives and potential impacts required in this criterion is to include all the above practices.

Critical habitats. Under Section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1536), all Federal departments and agencies, in consultation with the Department of Interior, are to utilize their authorities in furtherance of the purposes of the ESA, including the protection from destruction or modification of such habitats as the Secretary of Interior has determined to be critical to the continued existence of endangered species listed under Section 4. Any specific geographical area identified as critical habitat in 50 CFR Part 17, Subpart F may not be used for the disposal of solid waste unless it is demonstrated that the facility design, construction, operation, and maintenance will not jeopardize the continued existence of endangered species, and approval is obtained from the Office of Endangered Species, Fish and Wildlife Service, Department of Interior. Where other feasible alternatives exist (including technological and economic considerations), such critical habitat areas should not be used for solid waste disposal.

Recharge zones of sole source aquifers. Aquifers are water-bearing geologic formations which often yield significant quantities of water to wells or springs; a large percentage of the population in this country obtains its drinking water supply from these sources. Aquifers are replenished through recharge zones which are permeable to rainfall and surface runoff and through which the aquifer is susceptible to contamination. Section 1424(e) of the Safe Drinking Water Act of 1974 (Pub. L. 93-523) makes it possible for EPA to designate areas which are solely or principally dependent on an aquifer for drinking water supply. Disposal sites should not be located in the recharge zones of sole source aquifers when feasible alternatives (including technological and economic considerations) exist. However, when waste disposal facilities are located in the recharge zones of aquifers serving these designated areas they must be located (taking advantage of topography, depth to ground water, and natural soils), designed, constructed (generally including artificial liner(s)), operated, maintained, and monitored to prevent endangerment of the water source.

Other areas. The criteria on environmentally sensitive areas have been limited to wetlands, floodplains, permafrost areas, endangered species habitats, and recharge zones of sole source acquifers. Additional areas considered by EPA included active fault zones and karst terrain.

Surficial disturbances by active faults may result in shifts in waste disposal sites which may damage any liners used or expose wastes. Certainly, hazardous wastes should not be disposed in sites located over truly active fault zones. This issue will be addressed in the regulations being developed for hazardous wastes under Subtitle C of the Act. Active fault zones with a history of surficial disturbances are very few and well known in the United States. EPA had not proposed to specifically address this problem in these Criteria because those few States with such unique areas already have adequate controls.

Karst terrain is terrain which has been formed over limestone, dolomite, or gypsum as a result of solution processes; it is characterized by closed depressions or sink holes, caves, and solution channels, and commonly has underground drainage. Disposal of solid wastes on such a terrain faces problems distinctive to this unique geological setting: (1) Leachate produced at the site may be channeled without attentuation via solution cavities beneath the site into ground water and transported rapidly over substantial distances to unpredictable locations via turbulent groundwater flow through solution channels in the bedrock, and (2) a cavern or sink hole beneath the site can, in effect, ingest the entire disposal site into the ground water channels within the bedrock.

Because the characteristics and potential impact of karst terrain are so variable and complex, and because the ground-water criterion addresses the major concerns of disposal in karst terrain, EPA decided not to include karst terrain in the "Environmentally Sensitive Areas" criteria. However, care should be taken in evaluating risks on a site-by-site basis before solid wastes are disposed of on karst terrain. Surface geophysical techniques such as seismic and electrical resistivity surveys, when corroborates by well log data, are valuable in assessing subsurface conditions by indicating the abundance and sizes of air and waterfilled solution cavities in the underlying bedrock.

NOTE.—Comments are particularly solicited on the inclusion or exclusion of wetlands, floodplains, permafrost areas, endangered species habitats, sole source aquifers, active fault zones, and karst terrain as environmentally sensitive areas.

SURFACE WATER

This criterion seeks to help achieve the objective of the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92-500) of restoring and maintaining the integrity of the surface waters of the United States. Accordingly, all point source discharges of pollutants, including surface runoff, surface leachate, or leachate treatment effluent, must comply with an NPDES permit issued for the facility according to Section 402 of Pub. L. 92-500.

The criterion also requires, where possible, the prevention of direct discharges into surface waters of nonpoint sources of pollutants (unchannelled leachate seepage and surface runoff which may contain leachate, waste materials, or erosion sediment). Non-point source discharges should be prevented or minimized through facility design, operation, and maintenance, (e.g. by artificial or natural barriers, liners, or dikes), and by collection of such waters if produced (e.g. by ditch or trench). When collected, such waters become a point source which requires an NPDES permit if discharged to off-site surface waters. Flow of surface runoff from adjacent and surrounding lands should be channelled away from the disposal site to avoid contamination.

GROUND WATER

Ground water is often a high quality, low cost, readily available source of drinking water.[1] At least one half of the population of the United States depends upon ground water as a source of drinking water. Approximately ninety-seven percent of the Nation's water resource (excluding the oceans) is ground water. In many regions, ground water is the only economic and high quality water source available. In others, ground water can be developed at a fraction of the cost of surface water. Ground water in aquifers across the Nation is generally suitable for human consumption with little or no treatment necessary. Some large cities rely exclusively on ground water for drinking water.

[1] See "Waste Disposal Practices and their Effects on Ground Water, The Report to Congress," Office of Water Supply and Office of Solid Waste Management Programs, EPA, January 1977, for a further discussion of ground-water resources and contamination sources and problems.

Ground water has been contaminated by solid waste disposal facilities on a local basis in many parts of the Nation and on a regional basis in some heavily populated and industrialized areas, precluding its use as drinking water. Serious local economic problems have occurred because of the loss of ground-water supplies. The degree of contamination ranges from a slight degradation of natural quality to the presence of toxic concentrations of substances. Effective monitoring of potential sources of ground-water contamination is almost nonexistent, and many known instances of contamination have been discovered only after ground-water users have been affected.

Ground water usually moves very slowly; therefore, it often takes years or decades for contaminants to reach water users. It also takes decades or even centuries for a ground-water resource to purge itself even after a contamination source has been removed. The mechanisms of soil attenuation (sorption, ion exchange, precipitation, dispersion, or decay) have a limited capacity and are also reversible. Because of this, soil attenuation alone may be insufficient to assure prevention of ground-water contamination from a waste disposal facility.

When contamination does occur, legal action is seldom taken against the source of contamination because adequate monitoring generally does not exist, it is often very difficult and costly to prove the source of contamination, and the contamination may have occurred in the past, with no one remaining to take responsibility.

Since removing the source of contamination still does not clean up the aquifer once contaminated, the contamination of an aquifer can rule out its usefulness as a drinking water source for decades and possibly centuries. Also, cleanup of contaminated ground water may not be economically or technically feasible. Thus, the most effective means for protecting ground water is to control and monitor the potential source of contamination, rather than the aquifer or point of water use.

Proper site location (including avoidance of aquifer recharge zones), ground-water and land use planning, and proper design, construction, operation and maintenance of facilities are the principal techniques available for minimizing potential ground-water contamination problems. Where economics or other factors dictate that sites be located in areas of critical ground-water use (such as existing or potential drinking water sources), such technology as physical containment (liners), collection, and treatment of leachate may be necessary.

The ground-water criterion seeks to protect current users of the ground water and to protect other designated ground water for future use. Of primary concern is protection of current and future ground-water drinking water supplies.

The criterion uses the "endangerment" approach proposed for the Underground Injection Control Program (41 FR 36726) which prohibits contamination that would require additional treatment of current or future drinking water supplies or otherwise makes the water unfit for human consumption.

The ground-water criterion provides for application of "endangerment" at the property boundary of the disposal site. However, prevention of contamination of ground water within or under the site is often the only means to effectively achieve this goal at the property boundary. Monitoring ground water quality at the "waste boundary" (or within or under the site) may be desirable in order to anticipate potential "endangerment" at the property boundary and to measure effectiveness of control technology. Monitoring only at the property boundary may not provide ample opportunity for appropriate corrective actions because of time, economic, and technical constraints. Extending the property boundary would only postpone and aggravate the problem and would evade the intent of this criterion.

Some reviewers of early drafts of the Criteria have suggested that, in addition to or in lieu of the property boundary as point of application of "endangerment", a specific distance be designated. The specific distance (e.g. one kilometer) could be measured from the edge of the point of waste deposition or from the property boundary of the disposal facility. For example, "endangerment" would be determined on the basis of the site's property boundary or a point one kilometer from the edge of the waste deposit, whichever is closest to the solid waste.

NOTE.—While this approach is not proposed in the Criteria, comments on it are specifically solicited. Comments in support of this approach should indicate the distance which would be specified in the Criteria and explain the rationale for selection of that distance.

Under the ground-water criterion it is necessary to assess the impact of disposal facilities relative to the current and planned future utilization of the ground water. Utilization is divided into two categories: Case I addresses ground water currently used or designated for use as drinking water supplies or undesignated water containing 10,000 mg/1 total dissolved solids or less; and Case II addresses ground water designated for other uses. Thus, the criterion seeks to recognize and encourage definitive water planning decisions at the State and local levels.

In the case of ground water currently used or designated (planned) for use as a drinking water supply, the quality of the ground water beyond the disposal facility is to be maintained for that use. That is, the disposal facility is not to "endanger" the ground water beyond the property boundary.

In certain situations, conscientious resource management and societal needs may dictate that ground water be maintained at a quality either higher or lower than that provided by the "endangerment" concept which is based on the water quality needed when the water is used for drinking purposes. Such resource management decisions are appropriate at the State and local planning levels and should include participation of the public (e.g. public notice and hearings), involving the users of both the ground water and the facilities which may affect ground-water quality. Thus, if after specific determinations States designate ground water for uses other than drinking water, they should establish the quality at which the ground water is to be maintained consistent with the designated use. Consideration must be given to the finality of the designation and the potential impact on other water resources. The impact of a disposal facility would then be assessed against that quality specified by the State.

In order to predict, as early as possible, the potential for ground-water endangerment or the impact on groundwater quality, the disposal facility should be monitored so as to indicate the movement of contaminants from the disposal facility into the ground water. Contingency plans should be formulated for corrective actions to be taken in the event that an adverse impact is indicated by the monitoring.

AIR

Open burning is the uncontrolled or unconfined combustion of solid wastes. Uncontrolled means (1) the air or oxygen to fuel ratio (which determines the temperature and efficiency of combustion) is not governed, (2) the combustion residence time and mixing is not governed, or (3) the emissions of pollutants into the air are unchecked. Emissions of pollutants into the air from open burning are high compared to controlled burning such as municipal incinerators with air pollution control equipment (Table 1).

TABLE 1.—*Average emissions of air pollutants*[1]

[In pounds per ton]

Air pollutants	Open burning	Municipal incinerator	
		Wet scrubber	ESP[2] Unit
Particulate[3]	16	3.7	2.1
Carbon monoxide	85	35.0	35.0

TABLE 1.—*Average emissions of air pollutants*[1]—Continued

[In pounds per ton]

Air pollutants	Open burning	Municipal incinerator	
		Wet scrubber	ESP[2] Unit
Hydrocarbons[4]	30	1.5	1.5
Nitrogen oxides	6	3.0	3.0
Sulfur oxides	1	2.5	2.5

[1] SOURCE.—"Compilation of Air Pollutant Emission Factors," EPA, Report No. AP-42, 2d edition.
[2] Electrostatic precipitator.
[3] The EPA new source performance standard (40 CFR pt. 60) for particulate emissions from new incinerator facilities corresponds to 1.5 lbs/ton of waste.
[4] Expressed as methane (CH_4).

The impact of open burning is particularly acute in the major metropolitan areas and air basins. Open burning of wastes is generally prohibited in such areas unless a variance is obtained from the State and local air pollution control agency or board. However, establishing variances based on potential impacts is very complex because of the dynamic nature of the many variables involved (existing air quality, wind speed, humidity, mixing lid and vertical dispersion, efficiency of the burn, terrain, amount and type of wastes, etc.). Because of this, adequate variance procedures are often difficult to administer and enforce.

In addition to the potential health and property damages from air pollution, significant safety and damage threats caused by smoke and fire are associated with open burning. Smoke from open burning of wastes can reduce air and auto traffic visibility, and has resulted in incidents of multiple car accidents and deaths on expressways. Unconfined fires at dumps may spread and result in damage to property.

Because of these concerns, the criterion for air contains a prohibition of open burning for residential, commercial, institutional, and industrial wastes. Open burning of other waste types is also prohibited, except that, in special situations, States may give variances to this prohibition in accordance with State or local variance procedures. Such variances are to be conditioned upon specific climatological and meterological situations (e.g. air flow conditions and air quality), topographical and land use situations (e.g. in a valley, on a hillside, next to a hospital), and assessments of waste types and amounts, and are to provide for confinement to prevent the spread of fires. Such variances are not to be given in situations where smoke may interfere with the visibility of air or road traffic (i.e., near airports or expressways). An example of a waste type and situation when such a burning variance may be issued would be field and brush burning for agricultural purposes, under specific atmospheric conditions.

The air criterion also calls for the control of harmful waste emissions by evaporation and sublimation so as to protect public health and welfare.

NOTE.—Comments are requested on the advisability of also including specific emission or air quality limits based on a modification or extrapolation of OSHA air quality standards.

APPLICATION TO LAND USED FOR THE PRODUCTION OF FOOD CHAIN CROPS

Practices which result in the conservation, recovery, or utilization of waste materials in environmentally safe ways are strongly encouraged by EPA. The application of solid waste to the surface of the land may provide a significant benefit through the addition of organic matter, nitrogen, phosphorus and certain other essential trace elements to the soil. Specifically, the use of solid waste by land application coupled with good management techniques for enhancement of parks and forests and reclamation of poor or damaged terrain should be considered for the utilization of solid waste. Application of solid waste to agricultural lands may also be regarded as an environmentally acceptable method of disposal. However, when improperly managed, such practices can create a potential threat to the future productivity of the land and to the human food chain through the entry of toxic elements, compounds, and pathogens into the diet. Therefore, special criteria have been established for facilities that produce food chain crops. These Criteria require the implementation of good system design and operation in order to restrict practices that pose a substantial risk to public health or the environment. Only those facilities which are involved in the production of food chain crops must meet these special criteria as well as all other criteria in this regulation. Food chain crops are defined as tobacco; crops grown for human consumption; and pasture, forage, and feed grain for animals whose products are consumed by humans. (Facilities used for the disposal of solid waste on land which is not involved in the production of food chain crops are not subject to these special criteria. However, they must meet all other criteria in this regulation.)

At this time the criteria only address cadmium, pathogens, pesticides, persistent organics, and direct ingestion of waste. The criteria will be revised in the future to address other metals, organics, and compounds as more information becomes available on the human health implications of their application to land (e.g., PCBs, and other persistent organics). Future revisions of the criteria will also address substances which could adversely affect the productivity of agricultural land. Potentially phytotoxic metals such as zinc, copper, and nickel will be considered for inclusion. In the interim, additional guidance on maximum application rates and application of solid wastes to nonfood chain lands can be obtained from State and Federal agricultural departments, as well as from EPA's technical bulletin entitled "Municipal Sludge Management: Environmental Factors" (EPA 430/9-77-004).

The application of solid waste to land used for the production of food chain crops can, under certain conditions (e.g., solid waste with high levels of cadmium applied on low pH soils), results in significantly increased cadmium levels in certain crops. Further, cadmium is a cumulative toxicant so that the risks from continued ingestion at elevated levels increase over time. Because of these concerns, it is the intent of EPA to move toward minimizing cadmium additions to crop land by controlling waste disposal practices.

EPA, the Food and Drug Administration, and the U.S. Department of Agriculture as well as many other groups are concerned over the conduct of any practice which could significantly increase the cadmium level in food crops beyond current levels. This concern arises from an FDA assessment of teenage males in this country (class of individuals which consumes the most food), which concluded that their average daily intake of cadmium food and water approximates the total tolerable daily intake level recommended by the World Health Organization. FDA has stated that: "While there is no evidence that the present cadmium level in the U.S. diet poses a health hazard now, prudence dictates that new developments should not be established on a large scale that could cause a significant and possibly irreversible increase of cadmium in the food supply."

Based on these concerns, it is the intent of these criteria to minimize the movement of cadmium from solid waste applied to the land into the food chain. Two approaches are included for the management of cadmium. The first approach includes four site management controls which will minimize the uptake of cadmium. Under this approach, crop cadmium monitoring is not necessary. The second approach is specifically designed for facilities which are closely managed and monitored. It allows for the comparison of crops or meats produced from solid waste amended soils with similar crops or meats produced locally where solid waste has not been applied. This approach provides flexibility to those facilities which possess the necessary resources and expertise to intensively manage and monitor their operations.

The first approach (§ 357.3-5(a)(1)) includes four site management controls. Under this approach, annual and cumulative cadmium addition criteria are specified. A phased reduction of annual cadmium additions is proposed. This provides a limitation to be imposed immediately that will provide initial protection to the human diet. Over time, this proposed limitation would become more stringent, thereby providing greater degrees of protection. Phasing also gives communities and industry the time necessary to implement programs, such as source control and pretreatment of industrial discharges, to reduce further the cadmium concentrations in their wastes.

NOTE.—Comments are requested on the public health and environmental implications of this phased approach. Comments are also requested on the ability of locally implemented industrial waste pretreatment programs to reduce solid waste cadmium concentrations to levels which will permit continued land application on food chains crops within the schedule shown.

The maximum cumulative cadmium addition is based on soil cation exchange capacity (CEC) even though it is recognized that soil CEC is not the only factor to consider in setting levels of cumulative cadmium additions to soil. Other soil factors such as organic matter and hydrous oxide contents may be equally or more important in limiting metal availability. However, the cation exchange capacity of the soil was selected since it provides a measurable index of the soil's ability to limit cadmium availability to plants.

Data indicate that nearly all food crops may accumulate cadmium when grown on waste-amended soil with elevated cadmium levels. However, leafy vegetables, root crops, and tobacco generally accumulate cadmium to a greater degree than do grains. Therefore, in order to protect the food chain, this alternative places further restrictions on the cadmium concentration in solid wastes which are applied to land use for the production of leafy vegetables, root crops, and tobacco.

In order to minimize the movement of cadmium into plants as well as ground water, this alternative requires that the pH of the solid waste and soil mixture be controlled. While not included in the criteria, it is recommended that the ratio of cadmium to zinc in the solid waste be less than or equal to 0.015 (especially for high cadmium content solid wastes) where solid waste is applied to naturally acidic soils.

The second approach § 257.3-5(a)(2) recognizes the fact that a wide variety of site specific conditions and management variables can affect the level of cadmium entering crops. Rather than relying on operational criteria this approach establishes a minimum level of performance based on a comparison with the cadmium levels of the same crop species or meats produced locally where solid waste has not been applied.

The application of solid waste to land used for the production of crops which are directly consumed by man rather than by animals, must have cadmium concentrations which are comparable to similar crops raised locally. Adequate protection should be provided by comparing the cadmium concentrations in meats which are marketed (especially those portions of the animal which are known to accumulate cadmium such as the kidney and liver) rather than pasture grasses, forage, or other crops raised for animal consumption. This approach also requires that a contingency plan be developed which identifies alternative courses of action if the levels of cadmium in the crop are not found to be comparable with other local crops. The plan, at a minimum, should address restrictions on crop marketing future land use and sludge application rates.

NOTE.—Comments are requested on how to define comparability. Specifically, what analysis, if any, should be performed on the local crop or meat cadmium level monitoring data in order to establish the maximum allowable crop or meat cadmium levels permissible at a land application facility?

While the critieria in this section apply to all solid wastes, certain of them specifically address wastes of concern due to their pathogen content. Such wastes include hospital waste, municipal wastewater treatment sludge, and other wastes which may be of particular concern due to their pathogen content. The criteria require stabilization if such wastes are applied directly to the land's surface. In addition, crops normally eaten raw may not be grown for at least 1 year following the application of such wastes. A longer delay may be necessary if there are positive indications of viable Ascaris ova.

Since many solid wastes contain pesticides and persistent organics, in addition to heavy metals, the criteria require that any food and animal feeds grown on solid waste amended soils meet all applicable food quality regulations.

The direct ingestion of certain solid wastes (e.g., municipal wastewater treatment sludge) may be of concern especially if they contain pathogens, toxic organics, or heavy metals (especially cadmium, lead, and PCBs). Therefore, these wastes must be managed to avoid direct consumption of freshly applied solid waste by animals raised for milk or by humans.

DISEASE VECTORS

The criteria require that the facility minimize the availability of food and harborage for disease vectors, and, when necessary, use other means to control disease vectors. Of particular concern are rodents. At facilities which dispose of uncomposted or unprocessed putrescible wastes, an effective means to control rodents may be the application of cover material at the end of each operating day. Other means include composting or processing the waste so as to render it unattractive to rodents, or, generally less desirable but sometimes necessary, using rodenticides or repellants. At some facilities birds and flies are more difficult to control than rodents, but certain practices, such as the application of cover material, can help alleviate these problems. Mosquitos can be controlled by eliminating as much as possible the availability of standing water for breeding, by nonchemical controls such as predatory or reproductive control, and if necessary, by spraying with insecticides or repellants.

Cover materal. Cover material serves many purposes: (1) It helps in disease vector and rodent control, (2) it helps contain odor, litter, and air emissions, which enhances esthetics, (3) it lessens the chance and spread of fires, (4) it reduces infiltration of rainwater by increasing runoff and thereby decreases leachate generation and surface and ground water contamination, and (5) it enhances the site appearance and utilization after completion.

Because of the many advantages of cover material, the criteria require the use of cover materials where appropriate for the disposal of "all unshredded, unstabilized, putrescibe wastes." In remote areas, to minimize economic impact, EPA recommends regionalization and operation of disposal sites only on days when equipment is available to apply cover material. Cover material is already a requirement for such wastes in many States.

Landspreading of stabilized and composted wastes, surface impoundments, mining and milling wastes, and certain relatively inert wastes such as construction, demolition, and land clearing debris, generally do not require cover material because the wastes are nonputrescible, relatively stable and inert, or they are impracticable to cover. Because of these exceptions, the various criteria call for periodic application of cover material "where appropriate."

"Periodic application of cover material" is defined in § 257.2(s) as "the application of soil or other suitable material over disposed solid waste at such frequencies and in such a manner as to impede vectors and infiltration of precipitation; reduce and contain odors, fires, and litter; and to enchance the facility's appearance and future utilization." In general, these results can be achieved by covering the site at the end of each day that it is open to re-

ceive wastes. In remote areas, on days when sites are not open, storage bins may be provided for temporary storage of wastes.

SAFETY

Safety hazards include explosive, toxic and asphyxiating gases, fires, bird hazards, and exposure to wastes through uncontrolled access to disposal sites.

Gases. Solid waste disposal sites may produce explosive, toxic, or asphyxiating gases which may accumulate onsite or migrate offsite. Products of solid waste decomposition, oxidation, volatilization, sublimation, or evaporation may include gases such as methane and hydrogen (explosive and asphyxiating), carbon monoxide and carbon dioxide (asphyxiating) and chlorine (toxic). The presence of any of these or similar gases at a disposal site, in sufficient conventration, can pose a serious threat to the health and welfare of site employees and users, and occupants of nearby structures. Explosions, asphyxiations, and poisonings resulting in injury and death have resulted from disposal site gases. In addition, property damage, groundwater contamination, and vegetation destruction onsite and on adjacent lands have been caused by solid waste disposal gases. Measures need to be conscientiously implemented at waste disposal sites to avoid, prevent, or control the formation and migration of these gases.

The criteria call for the use of technology and methods to prevent gas migration offsite and to prevent accumulation in onsite structures in harmful quantities. The measures used to accomplish this are many, and frequently site specific. They may include control of incoming waste materials which may cause problems, location of the site away from occupied structures, design of structures onsite or on adjacent land to prevent migration, construction of barriers to gas migration at the site boundary, and use of vents or gas collection systems. Lateral migration may be impeded by surrounding the disposal site with low-permeability soils or other barrier materials. However, since all materials are somewhat permeable these barriers should be used in conjunction with vents. Vents may consist of gravel or open trenches adjacent to the low-permeability barrier and the use of porous or slotted pipes with or without pumps to stimulate gas flow either for dispersion into the atmosphere, or for concentration, destruction, or utilization, usually by combustion.

The explosive gas criterion is not intended to restrict the construction of gas recovery facilities or the storage of these gases on site in a safe manner.

Fires. This criterion is included to address the impact of fires at a solid waste disposal site beyond the air quality impact of open burning. Circumstances other than intentional burning by the site operator which may lead to fires at a disposal site include: Vandalism, carelessness, spontaneous combusting, and receipt for disposal of solid waste undergoing combustion (e.g., hot ashes). Any fire at a solid waste disposal site poses a threat of property damage and injury or death to site employees, users, and nearby residents. In order to minimize these dangers, site design and operation should address the prevention and control of such fires by: Monitoring wastes received, applying cover material or other suitable means to limit the exposure of flammable material, and providing firefighting equipment to promptly extinguish such fires. Underground fires may become very difficult to extinguish if not attended to immediately.

Bird hazards to aircraft. The most abundant source of information on the bird hazard problem can be found in Federal Aviation Administration (FAA) yearly reports on bird strike incidents, and in FAA advisory circulars: "Bird Hazards to Aircraft" (AC 150/5200-3A, 3/2/72), "Use of Chemical Controls to Repel Flocks of Birds at Airports" (AC 150/5200-8 5/2/68), "Bird Reactions to Scaring Devices" (AC 150/5200-9, 6/26/68), and "Announcing the Availability of International Civil Aviation Organization Airport Services Mannual. DOC-9137-AN/898, Part 3, Bird Control and Reduction" (AC 150/5200-22). A study published by EPA also identifies bird hazards to aircraft: "Bird/Airport Hazards at Airports Near Solid Waste Disposal Sites," Environmental Protection Publication SW-116, EPA, 1974.

These reports show that birds are often attracted to disposal facilities which receive putrescrible wastes, in spite of vector control efforts (compaction and cover of wastes, etc.). When airports are located near such disposal sites, a potential bird hazard (collision threat) to aircraft may exist.

The above studies and observations culminated in the issuance of FAA Order 5200.5, "FAA Guidance Concerning Sanitary Landfills on or Near Airports," dated October 16, 1974. The order states that solid waste disposal facilities have been found by study and observation to be artificial attractants to birds and, therefore, "may be incompatible with safe flight operations" when located in the vicinity of an airport.

The bird hazard criterion incorporates the 3,048 and 1,524 meter restrictions contained in the 1974 FAA order. Disposal facilities outside of these distances but within the conical air space described by Federal Aviation Regulations (FAR) Part 77 are to be reviewed on a case-by-case basis for potential bird hazard.

In regulating, managing, and planning for airports and aircraft operations, the FAA and State and local decision makers should avoid locations and operations which would result in a bird hazard to aircraft due to existing or planned solid waste disposal facilities. The following airport and aircraft locations and operations should be avoided:

(a) Runways used or planned for use by turbojet aircraft and located within 3,048 meters of a solid waste disposal facility.

(b) Runways used or planned for use only by piston-type aircraft and located within 1,524 meters of a solid waste disposal facility.

(c) Location or operation of an airport such that the conical air spaces described by FAR Part 77 and applied to the airport would include a solid waste disposal facility.

(d) Location of an airport such that its runways or approach and departure patterns are situated between a solid waste disposal facility and bird feeding, water, or roosting areas.

Access. Solid waste disposal facilities can cause injury or death to persons at the site. Such causes of harm, which are often easy to minimize, include:

(a) Operation of heavy equipment and haul vehicles;

(b) Hazards associated with the types of waste including sharp objects, pathogens, and toxic, explosive, or flammable materials;

(c) Accidental or intentional fires;

(d) Excavations and earth moving activities.

Potential harm to disposal site personnel can be minimized as a result of proper training, utilization of safety equipment, control of waste types, and other safe practices. The most effective means of minimizing the risk of injury to other persons is by complete prohibition of access to the site by non-users (e.g. by suitable fencing) and strict control of users while on the site. For individuals disposing of small amounts of wastes, storage or special disposal facilities can be provided near the site boundary or away from the area being utilized by professional solid waste management personnel.

The importance of this consideration cannot be overstated since persons have suffered injury and even death at uncontrolled waste disposal facilities. Furthermore, in most cases, there is little economic impact on solid waste disposal operations in accomplishing site access control.

PUBLIC PARTICIPATION

Extensive comments have been received and considered in the development of these proposed Criteria. These comments were submitted by a number of individuals and organiza-

tions in response to: (1) public meetings conducted by EPA (including those listed in 42 FR 6620, Feb. 3, 1977, and public meetings conducted by several EPA Regional Offices), (2) meetings with State solid waste agency personnel, (3) meetings with other groups representing local and regional governments, disposal facility operators, environmental organizations, industrial associations, professional societies, and other groups, (4) the Notice of Intent to Develop Rulemaking (42 FR 9803, Feb. 17, 1977) and the Advance Notice of Proposed Rulemaking (42 FR 34446-48, July 5, 1977), and (5) a working draft of the Criteria which was widely distributed outside EPA to representatives of local and State governments, other Federal agencies, industry, disposal facility operators, the scientific community, environmental organizations, and anyone requesting copies.

The first public hearing on the proposed Criteria will be held on the evening of March 1, 1978, in San Diego, Calif., at the following location:

The Executive Hotel (Terrace Room), 1055 First Avenue, San Diego, Calif. Registration: 7 to 7:30 p.m.

Additional public hearings are planned for late March or early April (following publication in the FEDERAL REGISTER of the notice of availability of the EIS/EIA). Tentative locations are: Washington D.C.; Kansas City, Mo.; and San Francisco, Calif. Notice of these hearings will be published in the FEDERAL REGISTER at least 30 days prior to the hearings. Requests to participate in the public hearings should be directed to: Public Participation Officer, Office of Solid Waste (WH-562), EPA, Washington, D.C. 20460, 202-755-9157. Such requests must be received prior to the close of business (4:30 p.m.) five working days preceding the date of the hearing and must include the names, addresses, and phone numbers of individuals or organizations seeking to make a public statement; the choice of public hearing location; and an estimate of the time required to make the statement. At least one legible copy of the prepared statement must be provided at the time of the public hearing.

EPA desires comments from the general public on these proposed Criteria. EPA is particularly interested in comments on: (1) Adequacy of the Criteria in providing for the protection of public health and the environment, (2) practicality of implementation of the Criteria (including availability of technologies and methods to comply with the Criteria and to determine compliance; and the feasibility of monitoring, administrative, and enforcement programs), (3) potential impacts on segments of our society and economy, and (4) any recommended alternatives.

Dated: January 27, 1978.

DOUGLAS M. COSTLE,
Administrator.

PART 257—CRITERIA FOR CLASSIFICATION OF SOLID WASTE DISPOSAL FACILITIES

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257.4 Effective date.

AUTHORITY: Sec. 1008(a)(3), sec. 4004(a), Pub. L. 94-580; 90 Stat 2803 and 2815; (42 U.S.C. 6907(a)(3) 6944); sec. 405(d), Pub. L. 95-217.

§ 257.1 Scope and purpose.

(a) These Criteria are for use in determining which solid waste disposal facilities pose no reasonable probability of adverse effects on health or the environment. Facilities failing to meet these Criteria will be considered open dumps for the purposes of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (the Act). Sections 4005(c) and 4003 of the Act prohibit open dumping, and require that such facilities must be closed or upgraded, except for facilities operating on a State-established compliance schedule which specifies an enforceable sequence of actions or operations.

(b) These Criteria also provide guidelines for sludge utilization and disposal, under section 405(d) of the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (Pub. L. 95-217). The owner or operator of any publicly owned treatment works must comply with the Criteria in accordance with section 405(e) of that Act.

(c) These Criteria apply to all *solid waste disposal* facilities as these terms are defined in the Act, with the following exceptions: (1) Facilities for the disposal of hazardous waste must comply with the regulations promulgated under Subtitle C of the Act; (2) regulations for the State Underground Injection Control Program (40 CFR Part 146) developed under authority of the Safe Drinking Water Act of 1974 (Pub. L. 93-523, 88 Stat. 1660 et. seq., 42 U.S.C. 300 et. seq.) will apply to undergound well injection in lieu of these Criteria; (3) agricultural wastes, including manures and crop residues, which are returned to the soil as fertilizers or soil conditioners are not subject to classification by these Criteria; and (4) overburden resulting from mining operations, including mining and milling waste, which is returned to the mine is not subject to classification by these Criteria.

§ 257.2 Definitions.

As used in these criteria:

(a) "Aquifer" means a geologic formation, group of formations, or part of a formation that is capable of yielding usable quantities of ground water to wells or springs.

(b) "Base flood" means a flood that has a 1 percent or greater chance of recurring in any year or a flood of a magnitude equalled or exceeded once in 100 years on the average over a significantly long period. In any given 100-year interval such a flood may not occur, or more than one such flood may occur.

(c) "Beneficial utilization" means the application of solid waste to land for the purpose of supplying nutrients or conditioning the soil.

(d) "Cation exchange capacity" means the sum of exchangeable cations a soil can absorb expressed in milliequivalents per 100 grams of soil as determined by the pH 7.0 ammonium acetate procedure (Schollenberger, C.J. and Simon, R.H., "Determination of exchange capacity and exchangeable bases in soil-ammonium acetate method", SOIL SCIENCE, 59: 13-25, 1945).

(e) "Contiguous zone" means the entire zone established or to be established by the United States under article 24 of the Convention of the Territorial Sea and the Contiguous Zone (Pub. L. 92-500, 86 Stat. 886, 33 U.S.C. 1362).

(f) "Discharge of pollutants" means (1) any addition of any pollutant to navigable waters, (2) any addition of any pollutant to the waters of the contiguous zone or the ocean from any source other than a vessel or other floating craft.

(g) "Disposal" means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters (Pub. L. 94-580, 90 Stat. 2799, 42 U.S.C. 6903).

(h) "Endangerment" means the introduction of any physical, chemical, biological, or radiological substance or matter into ground water in such a concentration that (1) makes it necessary for a ground-water user to increase treatment of the water (including treatment to meet any maximum contaminant level set forth in any promulgated National Primary Drinking Water Standard), (2) makes it necessary for a future user of the ground water to use more extensive treatment of the water than would otherwise have been necessary (based on current

technology), or (3) otherwise makes the water unfit for human consumption.

(i) "Facility" means any land and appurtenances thereto used for the disposal of solid wastes.

(j) "Facility structures" means any buildings and sheds, or utility or drainage lines on the facility.

(k) "Floodplain" means the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, which are inundated by the base flood.

(l) "Food chain crops" means tobacco; crops grown for human consumption; and pasture, forage, and feed grain for animals whose products are consumed by humans.

(m) "Ground water" means water below the land surface in the zone of saturation.

(n) "Leachate" means liquid containing dissolved or suspended materials that emerges from solid waste.

(o) "Navigable waters" means the waters of the United States, including the territorial seas (Pub. L. 92-500, 86 Stat. 886, 33 U.S.C. 1362).

(p) "Non-point source" means any origin from which pollutants emanate in an unconfined and unchannelled manner, including but not limited to surface runoff and leachate seeps.

(q) "Open burning" means the combustion of solid waste without (1) control of combustion air to maintain adequate temperature for efficient combustion, (2) containment of the combustion reaction in an enclosed device to provide sufficient residence time and mixing for complete combustion, or (3) control of the emission of the combustion products.

(r) "Open dump" means a site for the disposal of solid waste which does not comply with these Criteria (Pub. L. 94-580, 90 Stat. 2800, 42 U.S.C. 6903).

(s) "Periodic application of cover material" means the application of soil or other suitable material over disposed solid waste at such frequencies and in such a manner as to impede vectors and infiltration of precipitation; reduce and contain odors, fires, and litter; and to enhance the facility's appearance and future utilization.

(t) "Permafrost" means permanently frozen subsoil.

(u) "Pesticide" means (1) any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest, and (2) and substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant (Pub. L. 92-516, 86 Stat. 975, 7 U.S.C. 136).

(v) "Point source" means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged (Pub. L. 92-500, 86 Stat. 887, 33 U.S.C. 1362).

(w) "Pollutant" means any substance added to air, land, or water which impairs its chemical, physical, biological, or radiological quality.

(x) "Putrescible wastes" means solid waste which contains organic matter capable of being decomposed by microorganisms and of such a character and proportion as to be capable of attracting or providing food for birds and potential disease vectors (such as rodents and flies).

(y) "Recharge zone" means an area through which water enters an aquifer.

(z) "Sanitary landfill" means a facility for the disposal of solid waste which meets these Criteria (Pub. L. 94-580, 90 Stat. 2800, 42 U.S.C. 6903).

(aa) "Sludge" means any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effects (Pub. L. 94-580, 90 Stat. 2800, 42 U.S.C. 6903).

(bb) "Solid waste" means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activies, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923). (Pub. L. 94-580, 90 Stat. 2801, 42 U.S.C. 6903.)

(cc) "Stabilization" means any chemical, physical, thermal, or biological treatment process that results in the significant reduction of pathogenic organisms.

(dd) "State" means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands. (Pub. L. 94-580, 90 Stat. 2801, 42 U.S.C. 6903.)

(ee) "Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil condition. Wetlands generally include swamps, marches, bogs, and similar areas. (33 CFR Part 323—Permits for Discharges of Dredged or Fill Material into Waters of the United States.)

§ 257.3 Criteria for classification of solid waste disposal facilities.

For the purposes of classification under Sections 4004(a) and 1008(a)(3) of the Act, a facility for the disposal of solid waste poses no reasonable probability of adverse effects on health, safety, or the environment if it is so located, designed, constructed, operated, completed, and maintained that it meets the following criteria.

§ 257.3-1 Environmentally sensitive areas.

(a) *Wetlands.* The facility shall not be located in a wetland unless:

(1) The facility obtains an NPDES permit under Section 402 of the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92-500, 86 Stat. 880, 33 U.S.C. 1342), and

(2) If a levee or other type of containment structure is to be placed in the water as part of the disposal activity, the facility obtains a permit issued under authority of Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92-500, 86 Stat. 884, 33 U.S.C. 1344) according to the Army Corps of Engineers Permits for Discharges of Dredged or Fill Material into Waters of the United States (33 CFR Part 323).

COMMENT.—There is a strong presumption against the issuance of an NPDES permit for the discharge of solid waste into wetland areas. Only upon a showing of extraordinary circumstances—including a demonstration of alternative methods of disposal, an assessment of environmental impact for each alternative, an assessment of the technical and economic feasibility of each alternative, and a justification for the wetlands disposal alternative in view of the environmental impact and feasibility—will an NPDES application be considered and an NPDES permit issued. Any NPDES permit issued for the discharge of solid waste into wetland areas must assure that the facility utilizes appropriate technologies and/or best management practices to minimize any adverse effects.

(b) *Floodplains.* The facility shall not be located in a floodplain unless it is clearly demonstrated that:

(1) The facility will not restrict the flow of the base flood or reduce the temporary water-storage capacity of the floodplain such that increased flooding upsteam or downstream may result from the base flood, and

(2) The facility is designed, constructed, operated, and maintained so as to protect against inundation by the base flood, unless the facility is for land application of solid waste for beneficial utilization as agricultural soil conditioners or fertilizers.

(c) *Permafrost areas.* The facility shall not be located in permafrost areas unless:

(1) Other alternatives such as recycling or salvaging of materials, incineration and energy recovery of combustibles, deep well injection, and transport of the wastes back to more temperate regions are evaluated and determined to be technologically or economically infeasible, and

(2) The facility is sited on relatively dry and workable soils where minimal or no vegetative cover exists, and the facility is designed, constructed, and operated so as to minimze erosion and to minimize surface area consumed, and

(3) Regional disposal facilities are developed to the maximum extent feasible (including technological and economic considerations).

(d) *Critical habitats.* The facility shall not be located in critical habitat areas listed in 50 CFR Part 17, Subpart F: Critical Habitat, 1760 et seq., unless: It is demonstrated that such disposal operation will not jeopardize the continued existence of endangered species, and approval of the disposal plan is obtained from the Office of Endangered Species, Fish and Wildlife Service, Department of Interior.

(e) *Sole source aquifers.* The facility shall not be located in the recharge zone of an aquifer which is the sole or principal source of drinking water for an area designated under Section 1424(e) of the Safe Drinking Water Act of 1974 (Pub. L. 93-523 88 Stat. 1661, 1678, 42 U.S.C. 300f, 300h-3(e)) unless:

(1) Other alternative sites and waste disposal methods have been evaluated and determined to be technologically or economically infeasible.

(2) It is located, designed, constructed, operated, maintained, and monitored to prevent endangerment of the aquifer.

NOTE.—Comments are specifically solicited on the completeness, adequacy, and impact of the environmentally Sensitive Areas criteria.

§ 257.3-2 Surface water.

The facility does not adversely affect surface water quality and complies with the following:

(a) Point source discharge of pollutants, including channelled surface leachate, leachate seepage, surface runoff, and leachate treatment effluent, to off-site surface waters, complies with an NPDES permit issued for the facility according to Section 402 of the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92-500, 86 Stat. 880, 33 U.S.C. 1342).

(b) Non-point sources, including surface leachate, leachate seepage, and surface runoff are controlled so as to prevent or minimize non-point source discharges of pollutants into any off-site surface water.

§ 257.3-3 Ground Water.

The facility does not adversely affect ground water quality in accordance with Case I or Case II below.

(a) *Case I.* (1) For aquifers containing ground water which (i) is currently used or designated by the State for future use as a drinking water supply for human consumption, or (ii) contains less than 10,000 mg/l total dissolved solids and has not received designation pursuant to Case II; the quality of the ground water beyond the disposal facility property boundary is not endangered by the facility.

(2) For acquifers described in paragraph (a)(1) of this section the facility shall employ one of the following two operational means to assure that endangerment of the ground water quality is prevented:

(i) Any leachate produced shall be collected through use of artificial liners. Collected leachate shall be removed, recirculated, or treated as appropriate.

(ii) The facility shall control the migration of leachate by utilizing the site's natural hydrogeologic conditions, soil attenuation mechanisms and/or recovery and treatment of contaminated water. Where appropriate, infiltration of water into the solid waste shall be prevented or minimized so as to reduce leachate generation.

(3) For as long as leachate may enter ground water in such quantities and concentrations that the ground water quality may be endangered, monitoring of ground water, prediction of leachate migration, and a current and acceptable contingency plan for corrective action are required.

(b) *Case II.* (1) For ground water which is currently used or designated by the State for use other than as a drinking water supply for human consumption, the quality of the ground water beyond the disposal facility property boundary is maintained at such quality as specified by the State. ()

(2) A State may designate a groundwater source for use other than as a drinking water supply for human consumption if:

(i) The source is impractical for use as a drinking water supply due to the extent of its contamination, its depth, or the potential yield of the aquifer; or, after public hearings, it is determined that adequate alternative drinking water supplies are available for all users in the affected area into the foreseeable future, taking into account projected population growth, the extent, location, and nature of existing sources of drinking water, and other potential sources of ground water pollution, and

(ii) The waters of an adjacent State or country will not be endangered and adequate hydrogeologic conditions exist separating the ground water to be designated from waters to be protected so that protected waters are not endangered.

§ 257.3-4 Air.

The facility controls air emissions (including emissions by evaporation, sublimation, and oxidation) so as to comply with all applicable Federal, State, and local air regulations and to protect public health and welfare, and complies with the following prohibitions:

(a) Open burning of residential, commercial, institutional, and industrial solid waste is prohibited.

(b) Open burning of other solid waste (e.g. agricultural and silvicultural) is prohibited unless in compliance with State and local regulations.

§ 257.3-5 Application to land used for the production of food chain crops.

A facility for the beneficial utilization of solid waste by application to land used for the production of food chain crops complies with the following in addition to the other criteria contained in this regulation.

(a) *Cadmium.* Any site that is currently or will in the future be used for the production of food chain crops complies with either subparagraph (1) or subparagraph (2) of this paragraph.

(1) (i) The annual application of cadmium from solid waste does not exceed the maximum additions below.

Years*	Maximum annual Cd addition* (kg/ha)
Present to Dec. 31, 1981	2.0
Jan. 1, 1982 to Dec. 31, 1985	1.25
Beginning Jan. 1, 1986	0.5

*NOTE.—Comments are requested on the public health and environmental implications of this phased approach. Comments are also requested on the ability of locally implemented industrial waste pretreatment programs to reduce solid waste cadmium concentrations to levels which will permit continued land application on food chain crops within the schedule shown.

(ii) The maximum cumulative amount of cadmium applied to any hectare of land does not exceed: 5 kilograms on soils with a Cation Exchange Capacity (CEC) of less than 5, 10 kilograms on soils whose CEC is between 5 and 15, and 20 kilograms on soils whose CEC exceeds 15.

(iii) Solid waste containing cadmium concentrations in excess of 25 mg/kg dry weight is not applied to sites where tobacco, leafy vegetables, or root crops are or will be grown for direct human consumption.

(iv) Solid waste containing cadmium is applied so that the pH of the solid waste and soil mixture is maintained at 6.5 or greater.

(2) The land application of solid waste containing cadmium is acceptable is the resulting level of cadmium in the crops and meats marketed for human consumption are analyzed prior to marketing and shown to be

comparable to those levels present in similar crops or meats produced locally where solid waste has not been applied. A contingency plan is necessary which identifies alternative courses of action which may be taken if crop cadmium levels are not found to be comparable (e.g., restrictions on crop marketing, future land use, and sludge application rates). The contingency plan must also provide adequate safeguards to preclude risks from alternative land uses following the closure of the disposal site. This alternative is only available to those facilities which demonstrate that they possess the necessary resources and expertise to adequately manage and monitor their operations.

(b) *Pathogens.* (1) If solid waste of concern due to its pathogen content is applied directly to the surface of the land it is stabilized to reduce public health hazards.

(2) Land which has received solid waste of concern due to its pathogen content is not used for the production of human food crops which are normally eaten raw (except crops such as orchard fruits, where there is no contact between the solid waste and the crop) for at least one year following application or longer.

(c) *Pesticides and persistent organics.* The application of solid waste containing pesticides on land that is currently or will in the future be used for the production of food chain crops does not result in pesticide residues in or on crops in excess of the tolerances set pursuant to Section 408 of the Federal Food, Drug and Cosmetic Act (FFDCA; 21 U.S.C. 346a) and the regulations thereunder (40 CFR Part 180) and Section 409 of the Federal Food, Drug and Cosmetic Act (FFDCA; 21 U.S.C. 348) and the regulations thereunder (21 CFR Part 561).The application of solid wastes containing persistent organics on land that is currently or will in the future be used for the production of food chain crops does not result in persistent organic levels in or on foods in excess of those established by FDA (21 CFR Part 109).

(d) *Direct ingestion.* Solid waste of concern due to its pathogen, toxic organic or heavy metal content (e.g., lead and PCB) is not applied to a site so that the freshly applied solid waste may be directly ingested by animals raised for milk or by humans.

§ 257.3-6 Disease vectors.

The facility protects public health by controlling disease vectors. This shall be accomplished through minimizing the availability of food and harborage for vectors through the periodic application of cover material or other techniques where appropriate.

§ 257.3-7 Safety.

The facility does not pose a safety hazard to facility employees and users and to the public in accordance with the following:

(a) *Explosive gases.* The concentrations of explosive gases in facility structures (excluding gas control or recovery system components), or in the soil at the facility property boundary do not reach the lower explosive limits for the gases.

(b) *Toxic or asphyxiating gases.* Toxic or asphyxiating gases are not allowed to migrate off site, or accumulate in facility structures (excluding gas control or recovery components) in concentrations harmful to human, animal, or plant life.

(c) *Fires.* All fires are extinguished expeditiously; and fire hazards are minimized through proper site construction and design, and the periodic application of cover material where appropriate.

(d) *Bird hazards to aircraft.* Disposal facilities which receive putrescible wastes that may attract birds are not located (1) within 3,048 meters of any runway used or planned to be used by turbojet aircraft, or (2) within 1,524 meters of any runway used or planned to be used only by piston-type aircraft, unless it is determined that the disposal facility does not pose a bird hazard to aircraft. Determinations shall be made on a case-by-case basis for those facilities which are not within the above distances but are within the conical surfaces described by Federal Aviation Regulations Part 77 as applied to an individual airport.

(e) *Access.* Entry to the facility is controlled so as to minimize exposure of the public to hazards of heavy equipment operation and exposed waste.

§ 257.4 Effective date.

These Criteria become effective 30 days after final publication.

[FR Doc. 78-3151 Filed 2-3-78; 8:45 am]

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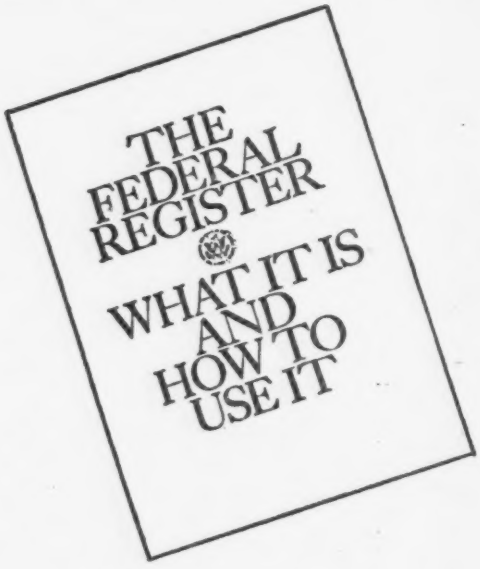

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